

REMARKS/ARGUMENTS

Reconsideration and allowance of the present application based on the following remarks are respectfully requested. Claims 11, 13, 15-17, 21, 22, and 24 have been amended. Claims 12 and 23 have been cancelled. Support for all amendments may be found throughout the specification. No new matter has been added. Upon entry of the above amendments, claims 11, 13-22, and 24, as amended, will be pending.

Claims 13-17 and 24 have been rejected under 35 U.S.C. § 112, second paragraph as indefinite. The amendments to the claims are believed to place them in full compliance with 35 U.S.C. § 112.

Claims 11-24 have been rejected under 35 U.S.C. § 103(a) as unpatentable over U.S. Patent 5,994,493 ("Krebs") in view of U.S. Patent 4,383,051 ("Meyborg") and U.S. Patent 4,443,563 ("Dirlikov"). The Examiner acknowledges that Krebs does not disclose the use of 1,4:3,6 dianhydrohexitol in the production of polyurethane-based hotmelt adhesives. The Examiner cites Meyborg and Dirlikov as disclosing 1,4:3,6 dianhydrohexitol and contends that it would have been obvious to substitute or replace the aromatic diols within Krebs' hotmelt adhesive with 1,4:3,6 dianhydrohexitol. Applicants respectfully disagree.

As is known in the art, high early or green strength is crucial to the performance of polyurethane hotmelt adhesives. Krebs, in this regard, teaches a hotmelt adhesive having high early strength, and states that "[a] main advantage of hotmelt adhesives over other adhesive systems lies in their very quick setting." (See Krebs at col. 1, lines 24-25) (emphasis added).

To the contrary, Meyborg mentions using 1,4:3,6 dianhydrohexitol in a polyurethane reaction mixture to slow the reaction between components of the mixture and, therefore, to extend the pot life of the reaction mixture. Such a slowing of the reaction between components, when considered in the context of a quick setting hotmelt adhesive, would presumably cause a slowing of the development of initial strength of the adhesive. Therefore, it would have been counter-intuitive to add 1,4:3,6 dianhydrohexitol to a hotmelt adhesive -- which, as discussed above, are desired to have high early strength.

In addition, it would not have been obvious to substitute or replace the aromatic diols within Krebs' hotmelt adhesives with 1,4:3,6 dianhydrohexitol,

because of the fundamental differences between 1,4:3,6 dianhydrohexitol and Kreb's aromatic diols in molecular geometry and in molecular packing properties. Specifically, Kreb's aromatic diols comprise carbon rings that are essentially planar in structure and which give rise to good molecular packing and pi-stacking properties by the diols and, therefore, good crystallinity properties. In contrast, 1,4:3,6 dianhydrohexitols comprise reactive hydroxyl groups and ring structures that are not aromatic and which, therefore, do not pi-stack or exhibit the high crystallinity properties of Kreb's aromatic diols. Accordingly, a skilled artisan would not have thought to substitute Kreb's aromatic diols with the 1,4:3,6 dianhydrohexitols of either Meyborg or Dirlikov, because of the belief that such a substitution would impermissibly render Kreb's unsatisfactory for its intended purpose.

Additionally, even assuming *arguendo*, that one would substitute or replace the aromatic diols within Kreb's hotmelt adhesives with 1,4:3,6 dianhydrohexitol in the manner suggested by the Examiner, the unexpectedly superior adhesion, flexibility, hydrolysis resistance, and thermal stability, in combination with high green strength, achieved in the context of the present invention would not have been foreseeable.


Therefore, all objections and rejections having been addressed, it is respectfully submitted that the present application is in a condition for allowance and a Notice to that effect is earnestly solicited.

Should any issues remain unresolved, the Examiner is encouraged to contact the undersigned attorney for Applicants at the telephone number indicated below in order to expeditiously resolve any remaining issues.

Respectfully submitted,

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